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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/069,668	04/29/1998	KIE Y. AHN	303.466US1	3628

21186 7590 05/22/2002

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EXAMINER

COLEMAN, WILLIAM D

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 05/22/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/069,668

Applicant(s)

AHN ET AL.

Examiner

W. David Coleman

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 February 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 and 32-38 is/are pending in the application.
- 4a) Of the above claim(s) 29 and 30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 and 32-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 28, 32, 33, 35, 36, 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai, U.S. Patent 5,235,204 in view of Wolf, "Silicon Processing For The VLSI ERA", vol. 2 (Process Integration), Lattice Press, 1990, pp. 116-117 & 126-127.
3. Pertaining to claims, 1, 4, 5, 7, 8, 9, 10, 28, 35, 36, 37, 38 and 39, Tsai discloses a semiconductor process substantially as claimed. See **FIG. 6**, where a method of making an emitter contact for an emitter region of a bipolar transistor is disclosed. Tsai discloses a polysilicon structure **60** over an emitter region position of a semiconductive substrate (not numbered). However, the metal emitter contact is not formed by cross diffusing the metal and a portion of the polysilicon structure. Wolf teaches the use of a doped polysilicon sacrificial barrier in the fabrication of contacts and interconnects (pp. 126). A thin layer of doped polysilicon can be used to separate the Al and the single-crystal Si substrate (Fig. 3-28). After the Al:Si alloy film as been patterned, the contact structure is annealed (pp.127). In view of Wolf, it would have been obvious to one of ordinary skill in the art to form the metal emitter contact of Tsai by cross diffusing the metal and a portion of the polysilicon structure, because this process alleviates the problem of junction spiking (pp. 116).

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4. Pertaining to claim 2, Tsai discloses an emitter region 40 as seen in **FIG. 6**. However, in the absence of new or unexpected results, the mere reversal of the order of performing process steps has been held to be prima facie obvious. In re Burhans, 154 F.2d 690, 69 USPQ 330 (CCPA 1946).

5. Pertaining to claim 3, Tsai discloses that the emitter region 40 is polysilicon and metallurgy level being aluminum, which is obviously a doped layer (p-type) that will outdiffuse into the polysilicon region when annealed.

6. Pertaining to claim 11, Tsai discloses that the metal layer 64, can be aluminum. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai, U.S. Patent 5,235,204 in view of Wolf, "Silicon Processing For The VLSI ERA", vol. 2 (Process Integration), Lattice Press, 1990, pp. 116-117 & 126-127, as applied to claims 1-3 and 7-11 above, and further in view of Aboelfotoh et al., U.S. Patent 5,801,444.

7. The combined teachings of Tsai in view of Wolf discloses a semiconductor process substantially as claimed as discussed above. However the combined teachings fail to disclose a polysilicon layer that includes polysilicon and germanium. Aboelfotoh discloses a semiconductor process wherein germanium is included with silicon for the purpose of making electrical contacts. See **FIG. 11** of Aboelfotoh, where germanium (11) is deposited with polysilicon for the purposes of a contact for a semiconductor device. In view of Aboelfotoh it would have been obvious to one of ordinary skill in the art to include germanium with polysilicon for contact formation because a substantial advantage to be gained is that electrically stable contact metallization (column 5, lines 49-51).

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 1-28 and 32-39 recites the limitation "metal" in independent claims 1, 4, 6, 12, 18, 20, 23, 28, 32, 33 and 35. There is insufficient antecedent basis for this limitation in the claim.

Correction is required.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

11. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. David Coleman whose telephone number is 703-305-0004. The examiner can normally be reached on 9:00 AM-5:00 PM.

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The examiner can normally be reached on 9:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M. Fahmy can be reached on 703-308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7721 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

WDC

May 15, 2002


LONG PHAM
PRIMARY EXAMINER